What is claimed is:

1. A method for use by a receiver of a wireless communication system in receiving over a communication channel a radio transmission of a number of symbols each having an in-phase and a quadrature component, the method including a step (11) of receiving and sampling the radio transmission so as to provide a succession of samples, and also a step (12) of filtering the succession of samples, the method characterized in that:

the step (12) of filtering the succession of samples includes a step (12b) of whitening the samples on a sample-by-sample basis by evaluating, for each sample in the succession of samples, a noise plus interference correlation matrix ($\widetilde{\mathbf{R}}_{ii}$) including information about the correlation of both the in-phase and quadrature phase components of the sample.

2. A method as in claim 1, wherein the step (12) of filtering is further characterized by:

a step (12a) of switching on or off the step (12b) of whitening the samples, with the switching based on determining whether the communication channel is sensitivity-limited so that noise is present that can be characterized as substantially white.

3. A method as in claim 1, wherein whether the communication channel is determined to be sensitivity-limited is based on a calculated value of a metric (M_{tc}, M_{ti}) and a corresponding predetermined threshold (τ_{tc}, τ_{ti}).

4. A method as in claim 3, wherein the metric (M_{tc}) is based on relative values of different components of the noise plus interference correlation matrix ($\widetilde{\mathbf{R}}_{ii}$).

5. A method as in claim 3, wherein the switching is based on comparing the value of a metric (M_{ti}) defined by

$$M_{ti} = \frac{R_{1ii}}{R_{0ii}}$$

where $R_{0ii} = E\left[\mathbf{i}_k^* \mathbf{i}_k\right]$ and $R_{1ii} = E\left[\mathbf{i}_k^* \mathbf{i}_{k+1}\right]$.

6. A method as in claim 3, wherein the switching is based on examining a second order or a higher order statistic of the noise plus interference signal ($\mathbf{i}_k$) related to the noise plus interference correlation matrix ($\widetilde{\mathbf{R}}_{ii}$).

7. A method as in claim 1, further characterized in that the noise plus interference correlation matrix ($\widetilde{\mathbf{R}}_{ii}$) is determined using:

$$\widetilde{\mathbf{R}}_{ii} = E\left[\mathbf{i}_k \mathbf{i}_k^*\right],$$

where $\mathbf{i}_k$ is a noise plus interference signal.

8. A method as in claim 7, further characterized in that each vector $\mathbf{y}_k$ representing one symbol is whitened using:

$$\widetilde{\mathbf{y}}_k = \mathbf{W} \mathbf{y}_k$$

where $\mathbf{W}$ is defined as the inverse of a square root operation on the noise plus interference correlation matrix $\widetilde{\mathbf{R}}_{ii}$, so that:

$$\mathbf{W} = \widetilde{\mathbf{R}}_{ii}^{-1/2}.$$

9. A method as in claim 1, wherein each symbol is indicated by one or more samples, including samples from possibly different antennas.

10. A receiver used as part of or with a wireless communication

system, characterized in that it comprises means (12) for performing the steps (12a 12b) recited in claim 1.

11. A receiver as in claim 10, wherein the receiver is part of a mobile station.

12. A receiver as in claim 10, wherein the receiver is part of a base station of a radio access network of the wireless communication system.

13. A system, comprising a mobile station and a base station used as part of or with a wireless communication system, each including a receiver, characterized in that at least one of the receivers comprises means (12) for performing the steps (12a 12b) recited in claim 1.